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The results of compensatory education (CE) were evaluated in 5 school districts distributed across the nation. These 5 districts represented a subsample of an earlier evaluation involving 11 districts. Data were gathered on the amount and type of CE and the achievement scores of the pupils participating in CE during the 1965-66 and 1966-67 school years under Title I of the Elementary and Secondary Education Act of 1965. The purpose of the study was to determine whether CE had improved student reading achievement, what types of CE proved most successful, and what pupil-school-environment factors were associated with achievement change. The results indicated increased achievement due to CE among pupils of lower achievement levels. CE efforts in reading appeared to be the most successful. Initial achievement and racial composition were 2 variables which correlated with changes in achievement. A related document is RC 002 951. (DK)

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FINAL REPORT
Contract No. OEC-0-8-080462-3513 (010)

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Volume I: Summary

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Final Report

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ANALYSES OF COMPENSATORY EDUCATION IN FIVE SCHOOL DISTRICTS

VOLUME I: SUMMARY

68TMP-93(I)

E.J. Mosbaek
and Others

TEMPO
General Electric Company
Washington, D.C. 20005

16 August 1968

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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PREFACE

This is a report on the work done by the General Electric Company —TEMPO under contracts HEW-05-67-55 (A Survey and Preliminary Cost-Benefit Analysis in Elementary and Secondary Education) and OEC-D-8-08042-3513 (Analyses of Compensatory Education within Schools from Five Major School Districts). Detailed findings of the first study are described in an earlier TEMPO report, Survey and Analysis of Results from Title I for Compensatory Education, 1 March 1968, available through the U.S. Department of Health, Education, and Welfare, Office of Education.

Volume I of this report summarizes the results of both research efforts. Sections 1, 2, and 3 of Volume I, which describe the overall Phase II effort, were prepared by E. J. Mosbaek of TEMPO. Section 4 of Volume I is a synopsis of the Phase I effort. Most of this section was written by Bayla White of DHEW. The basic data for the study were collected by joint teams of DHEW, OE, and TEMPO personnel. Some of these data appear in Section 5 of Volume I.

Volume II gives the detailed results from the case study of each of the five school districts included in the Phase II effort and describes the technical features of the methodology used. Volume II was prepared by F. R. Frola, K. F. Gordon, J. W. Harrison, and E. J. Mosbaek, all of whom are TEMPO staff members.

The effort and critical comments from personnel in local districts as well as personnel from DHEW and OE were crucial in carrying out this research. It has been agreed that none of the sample schools or school districts will be identified in the results reported.

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SECTION 1
SUMMARY

OBJECTIVES

The objectives of this study, which is the second phase of an analysis of the results of the U.S. Office of Education's Title I funding program for compensatory education, were to develop preliminary answers to the following questions:

1. Is the evidence of statistically significant enhancement from compensatory education (CE) stronger, and the estimates of magnitude greater, when adjustments are made for possible trends in achievement?

2. What are the distinguishing features of successful CE programs?

3. What school, pupil, and environmental characteristics are associated with enhanced pupil performance?

In carrying out these objectives TEMPO collected and summarized considerable information on allocation of CE funds as well as information on type and intensity of different CE activities.

SAMPLE CHARACTERISTICS

The analysis involved characteristics of CE activities plus the characteristics and reading achievement level of 6,500 pupils in 60 Title I schools in five school districts. These five school districts were a subsample of the 11 school districts included in an earlier (Phase I) TEMPO study.* Since the five districts were selected on the basis of available data they do not constitute a random subsample, and thus summary statistics from the two studies agree less than they otherwise might. For example, in the earlier study there was a

*Described in Section 4.

statistically significant positive change in the lowest decile for the entire sample, whereas the change in the lowest decile in this study is not statistically significant.

ANALYTICAL APPROACHES

Two analytical approaches were used, a "fixed-grade" approach and a "longitudinal" approach. The approach to achievement analysis of 1,200 pupils from District 8 was longitudinal, i.e., to compare achievement for the same pupil both before and after exposure to specific CE programs. The approach in the analysis of the 5,300 pupils in the other four districts was to compare achievement of two successive groups of pupils in the same grade in a school. The first group was pupils tested in 1965-66 when there was little or no exposure to CE, and the second group was pupils tested in 1966-67 or 1967-68 after CE from Title I had been implemented.

CHANGES IN ACHIEVEMENT

It was not possible to make reliable adjustments for possible trends in achievement in Title I schools. However, the more detailed analyses in this Phase II study permit a different focus on the type and amount of enhancement from CE than was available from the earlier study.

Title I funds have significantly increased the amount of CE in all five school districts. It appears that the increased CE has, in turn, led to significant improvement in the achievement level for some pupils. The degree of success appears to vary widely among CE activities even within the same district.

For 790 pupils in a CE reading program in District 8, the rate of increase in achievement during the 8-month CE program was twice as great as might have been expected in the absence of CE. The expected increase in grade level for these pupils was 0.7 of a year per year, and the actual increase with CE was 1.4 years per year. In District 13, the average increase in achievement for all pupils in sample schools was approximately 1 month greater than would be expected in the absence of CE.

RESULTS VARY WIDELY

Other results obtained during this study are not as encouraging with respect to enhancement from CE as those indicated above. A

second major CE activity in District 8 showed no evidence of success even though CE expenditures per pupil were greater than for the activity which doubled the rate of increase in achievement. Results for Districts 10 and 12 show no significant change in achievement during the periods analyzed. In District 14, there is evidence that the average achievement of the lowest 10 percent of pupils in Title I schools actually decreased during 1966-67, even though there was an average increment of $80 per pupil for CE.

SPECIFIC DATA NEEDED

We suggest that the striking results within District 8 reflect, in part, the better data that were available rather than the possibility that other sample districts did not have as good CE activities as this district. In the Phase I study, data on specific pupils were not available, and the general conclusion from summary statistics on all pupils in Title I schools in District 8 was that changes were not statistically significant. This points up the need for more complete statistics concerning CE programs.

It was not possible to develop definitive answers to the questions concerning distinguishing features of successful CE and pupil-school-environmental characteristics associated with enhanced pupil performance. However, several important hypotheses and insights were developed. These are presented in the discussion of each district in Appendices 1 through 5 and are summarized in Section 3. There were few data for testing hypotheses because of the great diversity in types of CE and target groups of pupils.

WIDE DISPERSION OF CE FUNDS

By and large, local school officials have allocated CE funds over a wide range of activities and have oriented them to a large population of pupils. There is a general tendency to allocate, say, 20 percent of Title I funds to a very small number of pupils and to allocate the other 80 percent over such a large number of pupils that in most cases the funds amount to less than $5 per pupil.

PRESSING QUESTIONS

It is possible that a more intense concentration of funds on certain programs and pupil categories might have resulted in more significant improvements in reading achievement level. However, the need

for CE far exceeds the availability of Title I and local funds. This immediately raises the following questions for local school officials:

- What should be the priorities among many alternative end objectives, e.g., equal amounts for all pupils or concentration on the few most needy pupils?

- What achievement results can be expected for a specified CE activity for a given target group of pupils?

- What are the true total cost and the most efficient way of implementing a specified CE activity for a given category of disadvantaged pupils?

Each of these questions must be addressed before the policy of wide dispersion of CE funds can be criticized meaningfully..

SECTION 2
STUDY OBJECTIVES AND METHODOLOGY

The objectives of this study, which is the second phase of an analysis of the results of the Title I funding program for compensatory education, were to develop preliminary answers to the following questions:

1. Is the evidence of statistically significant enhancement from compensatory education (CE) stronger, and the estimates of the magnitude greater, when adjustments are made for possible trends in achievement?

2. What are the distinguishing features of successful CE programs?

3. What school, pupil, and environmental characteristics are associated with enhanced pupil performance?

These questions differ primarily from those addressed in the Phase I study in that they reflect a more intensive effort to determine whether trends in achievement levels were present in the samples examined. The presence of such trends might dictate adjustments in study results and allow more definitive answers to all three questions.

To accomplish the Phase II objectives, TEMPO collected and analyzed data at the grade level within each sample school in five of the 11 school districts previously analyzed in the Phase I study. These data included type and amount of CE, teacher salaries for regular programs, pupil-school-environment characteristics, and achievement scores. The analysis was based on the fixed-grade approach in Districts 10, 12, 13, and 14 and on the longitudinal approach in District 8.*

This research effort was, in essence, a more detailed analysis of the data collected during the Phase I effort from March through

*See Appendix 6, Volume II, for definitions of the fixed-grade and longitudinal approaches.

December 1967. The cost data were refined; questions about achievement data were resolved; and in Districts 10, 12, and 14 additional achievement data were obtained in order to derive more definitive answers on questions concerning change in achievement.

In view of the results for the fixed-grade approach in Phase I and the results from the fixed-grade approach for four districts in Phase II, the opportunity to employ the longitudinal approach in District 8 seemed significant. Consequently, the analytical approach for this district was changed slightly to provide insight into the advantages of analyzing available longitudinal data.

All analyses were oriented toward determining the effects of CE activities regardless of whether or not they were funded by the Title I program. In Districts 8, 10, and 13 pre and post refer to academic years 1965-66 and 1966-67, respectively. In Districts 12 and 14, two sets of comparisons were made—one with 1965-66 as pre and 1966-67 as post and another with 1966-67 as pre and 1967-68 as post. Since the CE activities were measured explicitly (dollar per pupil), it was not necessary that the "pre" pupils have a zero exposure to CE in order to evaluate the effect of CE activities conducted between the pretest and posttest.

The level of expenditures for the regular program, i.e., non-CE educational activities, was explicitly identified and brought into the analysis for two reasons. First, there is such a large sampling variation in achievement results that it is important (if possible) to identify specific sources so that variation caused by them can be controlled or removed. It was assumed that changes in the quality of instruction would be the largest source of variation, and it was felt that level of expenditures per pupil could be used as a proxy variable for quality of instruction. Second, it was desirable to determine whether levels of expenditures for regular school programs were affected by the availability of Title I funds.

It was realized that differences in the average achievement level for two groups of pupils in, say, grade 6 in a school in two different years is affected by the quality of education in grades kindergarten through 6 for each group. However, it was not feasible to obtain expenditure data for all prior years. Consequently, expenditure data for the set of pre pupils and the set of post pupils were limited to expenditures incurred during the 12 months preceding the respective test dates, as shown in Figure 1.

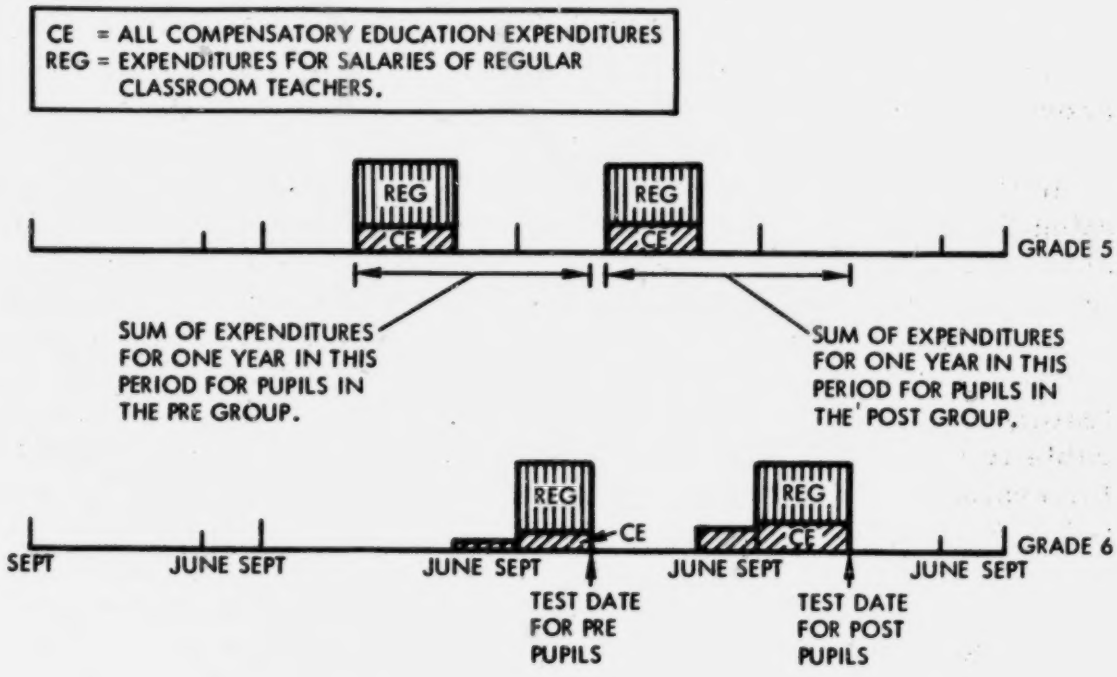

Figure 1. Determining expenditures for pupils in pregroup and postgroup for Grade 6 with test dates as shown.

The estimate of expenditures for regular programs was limited to salaries of regular classroom teachers on the assumption that variation in quality of education between two consecutive years would mainly be limited to changes in instructor personnel among all components of expenditures. This is also the largest component of expenditures. Although limiting the measure of regular expenditure to classroom teachers and limiting the period to one year does not enable us to reduce sampling variation caused by differences in quality of instruction fully, it does not introduce any bias into the analysis.

Most of the analysis of achievement in the fixed-grade approach in the four districts was carried out in terms of Standard T-scores. This enabled us to combine the results for different grade levels. However, in the analysis of trend and in the longitudinal analysis of District 8, grade-equivalent scores were generally used. Grade-equivalent scores have an advantage over Standard T-scores in that the unit of measurement is in familiar terms, and the significance in terms of achievement level can be readily determined. Whenever Standard T-scores were used, the summary results were translated

into grade-equivalent scores to reflect the educational significance as well as the statistical significance of the estimates. Discussion of conversion techniques and tables for converting from one type of score to another are presented in detail in Reference 43.

In the fixed-grade approach the so-called control group for evaluating the effect of CE is the pupils in the pre year. In the longitudinal approach several different means were used to select a control group (or reference point) for judging the net effect of CE. Since these techniques are applicable only to District 8, they are explained along with the results for District 8 in Appendix 5. However, there is one feature that comes to light more in longitudinal analysis but is applicable to both approaches: the selection of a measure of achievement for evaluating CE. Alternative measures for comparison, as indicated in Figure 2, include:

1. Slope from a to b compared to slope of 1.0 for norm achieving pupil,

2. Achievement level after exposure to CE (b) compared to norm achievement level (d),

3. Achievement level after exposure to CE (b) compared to an estimate of the potential level of pupil involved,

4. Measurement of the difference between the observed value for (b) and the estimated value of (c) i.e., estimated achievement without CE.

In order to avoid measuring progress of pupils enrolled in CE activities in terms of the so-called norm-achieving pupil, TEMPO chose to use the fourth measure in this study.

The formal statistical procedures used* included computation of means, standard deviations, simple correlation coefficients, regression coefficients, and the "t" and "F" tests.

*The more detailed techniques are described in Appendix 6.

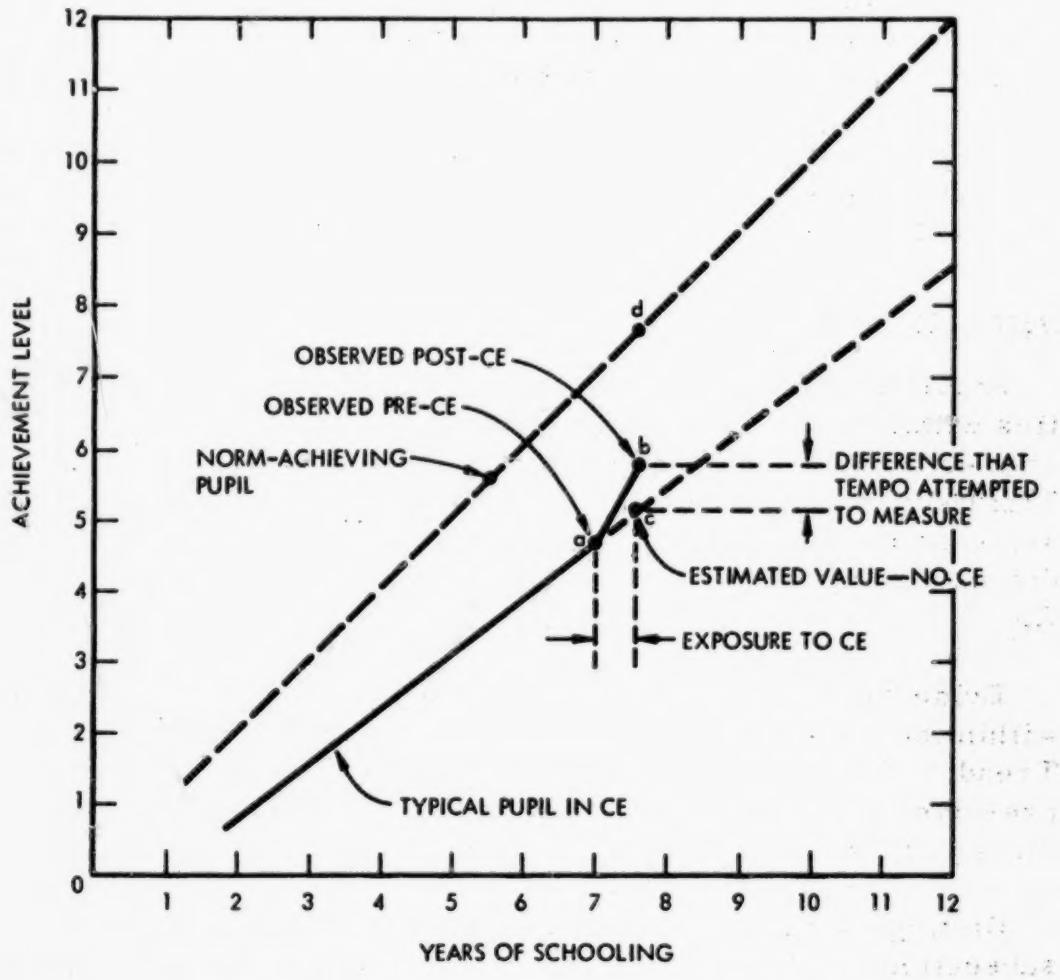

Figure 2. Identification of different measures of achievement.

SECTION 3

CONCLUSIONS FROM THE FIVE CASE STUDIES

INTRODUCTION

Available data on pupils and compensatory education (CE) activities within each of the five districts were analyzed in an attempt to answer the three major questions addressed by Phase II of the study. This section summarizes and integrates conclusions resulting from analyses of each district with respect to these three questions and discusses other findings that are of general interest in evaluation of CE.

Evidence on possible negative trends in achievement for schools within the Title I program is presented in the following "Analysis of Trend." This evidence is drawn from trend data for specific schools presented in the case study of each school district in Appendices 1 through 5, Volume II.

Distinguishing features of successful CE are presented in the third subsection. In addition there is a summary of the new evidence on type and amount of enhancement from overall CE activities.

Pupil-school-environmental factors that are associated with success from CE are discussed in the fourth subsection. These factors are commonly referred to as state variables because they are the given conditions in which CE is implemented.

In addition to results directly applicable to the three main questions addressed by the study, the allocation of CE funds and differences in amount of exposure to CE are summarized in the fifth and sixth subsections. New insights into differences between the fixed-grade and longitudinal approaches are presented in the last subsection.

ANALYSIS OF TREND

TEMPO's hypothesis of how a trend factor would affect achievement scores in successive years is shown in Figure 3. The trend

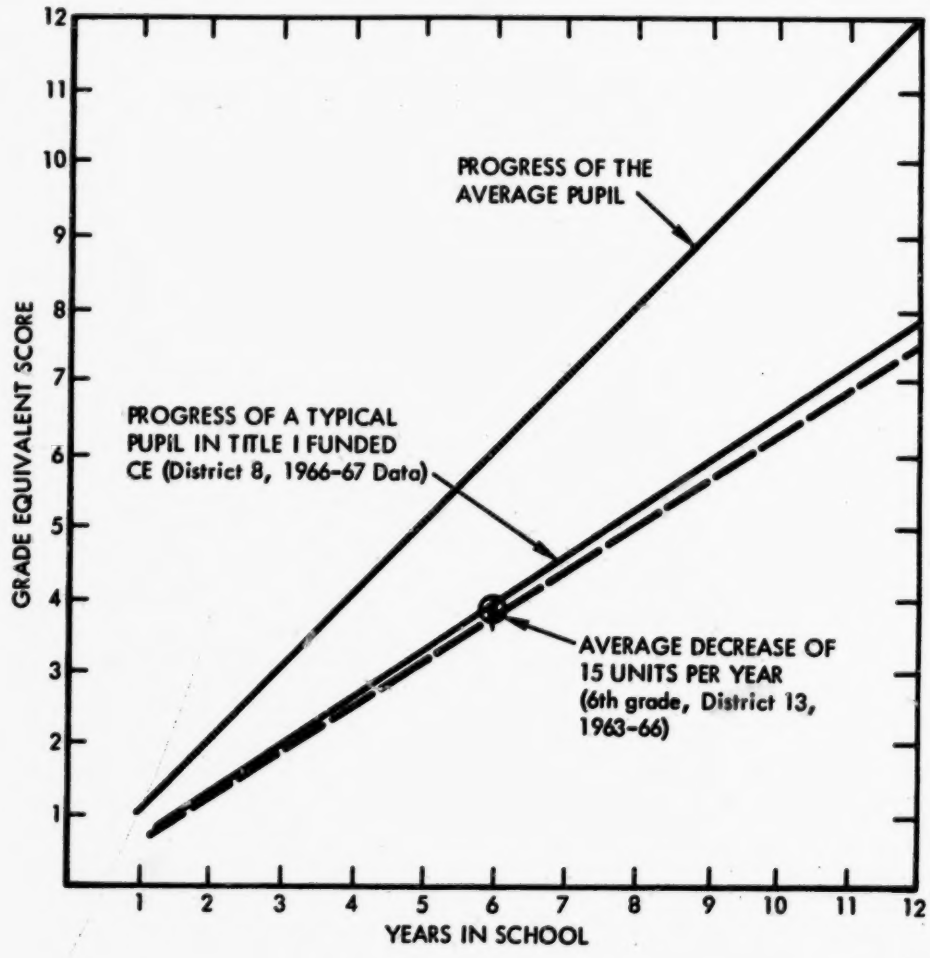
GRADE EQUIVALENT SCORE
YEARS IN SCHOOL
PROGRESS OF THE AVERAGE PUPIL
PROGRESS OF A TYPICAL PUPIL IN TITLE I FUNDED CE (District 8, 1966-67 Data)
AVERAGE DECREASE OF 15 UNITS PER YEAR (6th grade, District 13, 1963-66)

Figure 3. Hypothesis of the effect of a negative trend.

factor, if any, is probably small as shown by the closeness of the lower two lines and is postulated to affect the slope of the progress curve as shown by the divergence of the lines, rather than being a systematic shift over the entire range of grades 1 through 12.

Various reasons have been specified for expecting a negative trend in achievement within inner-city schools. The tendency in the last several years has been for families with low income and limited education to move to inner-city areas and for families with higher income and better education to move from the city to the suburbs. This can be expected to change the average achievement level of the population in the inner-city area. In addition, the expanding population

and expanding tax base in suburbs have allowed newer and better educational facilities and perhaps better qualified teachers than in the inner-city areas.

The data in this study do not present a consistent picture on trend. The pattern of variation during the years for which data are available indicates that sampling variation from year to year is much larger than any trend factor that might be operating at the school level.

The fact that significant trends did not show up in the 60 sample schools in five school districts is important. A negative trend was expected based on the results in the Phase I study and the socioeconomic trends described above. The data analyzed in the more detailed Phase II study do not confirm the expectation. This means that there is no trend within inner-city schools, or that it is erratic and small. The average among seven schools in District 14 showed a slightly upward trend for the period 1964-68. The average among seven schools in District 13 showed a negative trend. The averages at different grade levels in District 8 showed an inconsistent pattern.

No adjustments were made for trend in any of the school districts. Although data for District 13 showed a consistent pattern, the personnel in District 13 highly discouraged making any adjustment for trend.

TEMPO suggests that the hypothesis of a negative trend is worth additional testing. However, this will have to be carried out with considerably more data than are available from this study. Further study should involve several grades in each sample school, and the number of schools should be large in order to control sampling variation and detect what is likely to be a small trend factor if indeed it exists at all.

DISTINGUISHING FEATURES OF SUCCESSFUL CE

Table 1 summarizes the net change in achievement for longitudinal data in District 8 and the combined data from the fixed-grade approach in the other four districts. As stated elsewhere, however, the emphasis in this study has been placed on analysis within each of the five districts and not on the combined results for all districts.*

*Differences in results shown in Table 1 and Table 6 of TEMPO's Phase I report (Reference 43) are of little significance because the sample of 11 school districts analyzed in the Phase I effort was not selected on a random basis, and the second selection of five of the 11

Table 1. Best estimate of net change in achievement attributable to CE.[a]

Number of Participants	Measure of Achievement	Unweighted Observations[b]			Weighted Observations[c]		
		Average Change[a]	Standard Error	Significance Level[d]	Average Change[a]	Standard Error	Significance Level[d]
Combined Results for Districts 10, 12, 13 and 14 (27 schools, 72 grade units, 5,300 pupils)	ΔMean ΔLowest Decile ΔLower Quartile ΔUpper Quartile	0.27 0.23 0.36 0.21	0.30 0.46 0.34 0.37	0.40 e 0.30 e	0.22 0.14	0.24 0.42	0.40 e
District 8 - Reading Improvement CE Activity (16 schools, 45 grade units, 557 pupils)	Change in score of each pupil	0.7 GE units per year	0.05	0.001			
District 8 - Classes of Twenty CE Activity (3 schools, 6 grade units, 61 pupils in CE activity, 169 pupils in control group)	Change in score of each pupil	-0.04 GE units per year	0.22	e			

Notes:

[a] In units of Standard T-Scores.
[b] Simple average of the 72 observations.
[c] Average with sample observation weighted by average number of pupils who took pretests and posttests.
[d] Probability that the observed sample result could have happened by chance if the true change over the test interval was indeed zero.
[e] Greater than 50 percent.

SECTION 3

The average change in achievement for the combined results in four districts is positive for all four measures. None of the four, however, is significant at the 10 percent confidence level. One of the two major CE activities in District 8 (reading improvement) appears to have been highly successful. The best estimate of the net effect of CE was large—0.7 grade equivalent units per year—and the estimate appears to be statistically significant. There is no significant change in achievement that can be associated with the second major CE activity in District 8.

CE activities oriented specifically toward improvement in reading were the most successful.* This is evident from comparison of the reading program with the other major activity in District 8 and a comparison of the grades in Districts 12 and 13 which had significant reading CE activity with grades which had less reading but more of other types of CE activities.

The success of the Reading Improvement CE Activity in District 8 is shown in Figure 4. The lower solid line indicates the expected rate of improvement of these pupils in the absence of CE. Each dotted line shows the average rate of improvement for a specific grade level during the period in which the pupils were enrolled in the reading improvement CE. All of the rates were greater than 0.65, which is the estimate of rate of improvement in the absence of CE. The rates for all but grade 6 were greater than 1.0, which is the average rate for the norm-achieving pupil.

The estimate of a 0.65 rate of improvement in the absence of CE for pupils of the type selected in District 8 for reading CE appears to be reliable. Data for approximately 500 pupils in each of two years was used in establishing the estimate. The estimate was derived from regression analysis of achievement level of pupils prior to enrollment in the reading CE. Details are explained in Section F, Appendix 5.

There is no evidence that the general policy of allocating CE funds to a large number of CE activities and to a large number of pupils

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(continued) districts for the present effort was based on availability of data rather than on a random subsample. Thus, neither table is representative of the total Title I program results.

*Reading achievement level was the only measure of accomplishment used in this study.

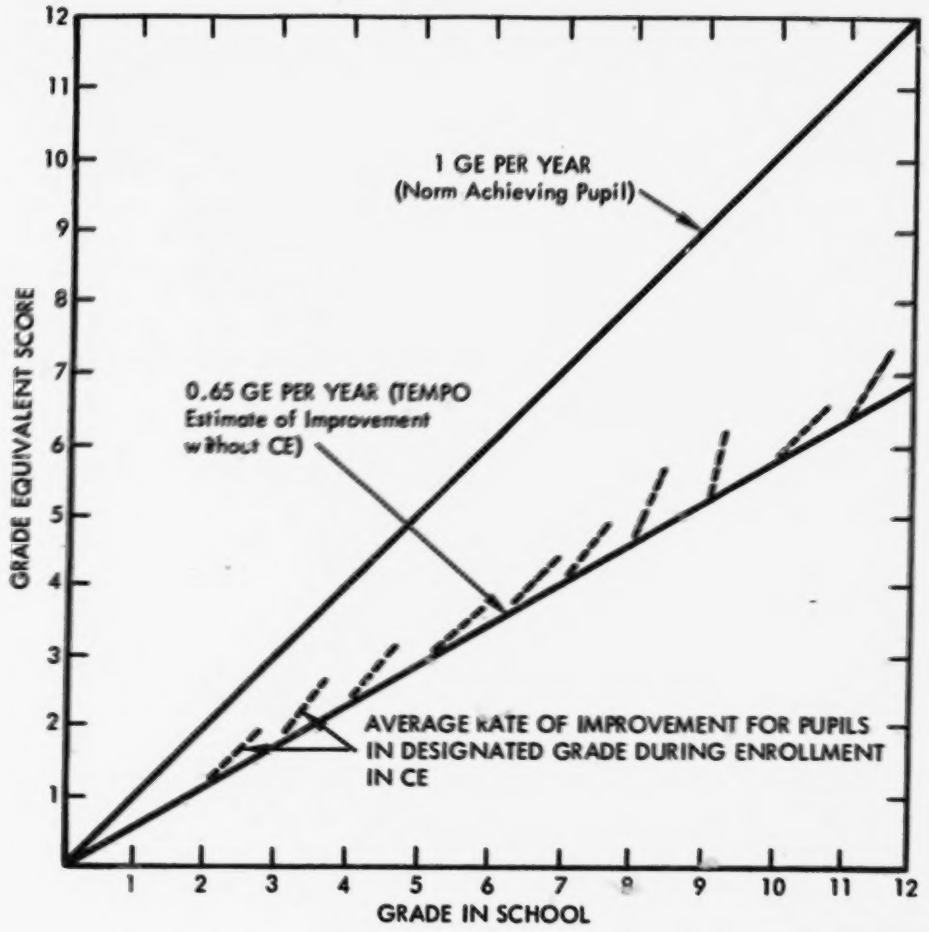

Figure 4. Rate of increase in achievement level for pupils in reading improvement CE, 1966-67—District 8.

has any significant impact. Each school district had a large number of CE activities that affect virtually all of the pupils in Title I schools, but these usually amounted to an expenditure of less than $5 per pupil. If this wide dispersal of funds were successful, it should be reflected in an increase in the average achievement level for all pupils in Title I schools. This is not supported by the figures in the upper part of Table 1.

The following distinguishing features of CE activities are important in the design of a CE program:

1. Teacher aides versus regular teachers,

2. Activities oriented toward improving teachers versus activities oriented toward pupils,

3. Buildings and equipment versus more personnel,

4. Combination of pupil-oriented activities (e. g., academic, cultural, and health) versus academic-only oriented activities,

5. More counseling and testing for pupils versus more instruction.

Each type within each of the above alternatives was implemented in one or more grades in the sample school districts, but either data were too few or simultaneous variation in other factors prevented a reliable estimate of the effect of each type.

An attempt was made in the regression and correlation analysis to determine whether change in achievement was closely related to level of expenditure for CE activities and for regular classroom teachers, but, not surprisingly, the estimates of regression and correlation coefficients produced inconclusive results. First, there were only small amounts of CE expenditures in many cases. For example, in nine of the 22 observations in District 10, the CE expenditures were recorded as zero. Second, with respect to regular classroom expenditures, the achievement level of a pupil is affected by his education in all previous years, whereas the study data reflect expenditures for only the 12-month period preceding the test data. The "regular expenditures" variable was introduced to reduce sampling error in measuring the effects of CE; it was not included for the explicit purpose of measuring returns to scale from educational resources.

Although the results for District 8 show that the activity with a $180-per-pupil expenditure was more successful than the activity with $316, this probably reflects the difference in type of CE rather than difference in level of expenditure. The difference in results of the most successful CE for two different years does suggest a hypothesis well worth testing. This hypothesis is that the same reading improvement activity when conducted every other day is nearly as successful as when conducted every day. It is possible that there is a limit to the contribution each type of CE activity can make, and in some cases, this can be reached with modest expenditure levels (e.g. $200 per pupil). However, even if there should be diminishing returns from a specific CE activity, there might be need for several types of CE for the same pupil.

TEMPO is aware of the conflicting views on the relation between gains in achievement level and expenditure level. It appears to us that statistical problems associated with multicolinearity and errors in measurement are probably covering up relations between expenditure level and achievement. It is hard for us to visualize that education runs contrary to many other phenomena studied by economists in which it has been found that increases in resources bring increases in returns.

CHARACTERISTICS ASSOCIATED WITH SUCCESS OF CE

The primary objective in the analysis of this topic was to determine whether particular pupil-school-environmental characteristics (state-of-condition variables) are associated with the amount of success from CE activities. In this study there were only a few instances among the sample observations showing clear evidence of success from CE. Consequently, the analysis of state variables was associated with change in achievement, regardless of whether the change resulted from CE or not.

It appears that characteristics associated with the pupil and classroom are of considerable importance, but characteristics associated with the overall school are of lesser importance. Figure 5 shows the change in the lowest decile by grade for each sample school in Districts 10, 13, and 14. For example, in District 10, the change for grade 3 in School 1 was +4.8; while the change for grade 6 in the same school was -9.9 standard T-scores. Most schools in the sample had both negative and positive changes for different grades. If factors associated with an entire school were the most important factors we would expect to see the various grades within a school grouped closely together. The approximately equal variation among grades within a school and among grades in different schools suggests the hypothesis that it is factors associated with the pupil and classroom that determine most of the year-to-year changes in achievement level.

The state variables investigated include mobility, mean preachievement level, attendance, change in attendance, percentage of Negro pupils, grade level, and school. When these data were collected, the above observation on importance of classroom and pupil data relative to school data had not been made. In addition, it was not feasible to obtain data at the pupil and classroom level for past periods. Consequently, data on all of the above variables represent averages at the school level.

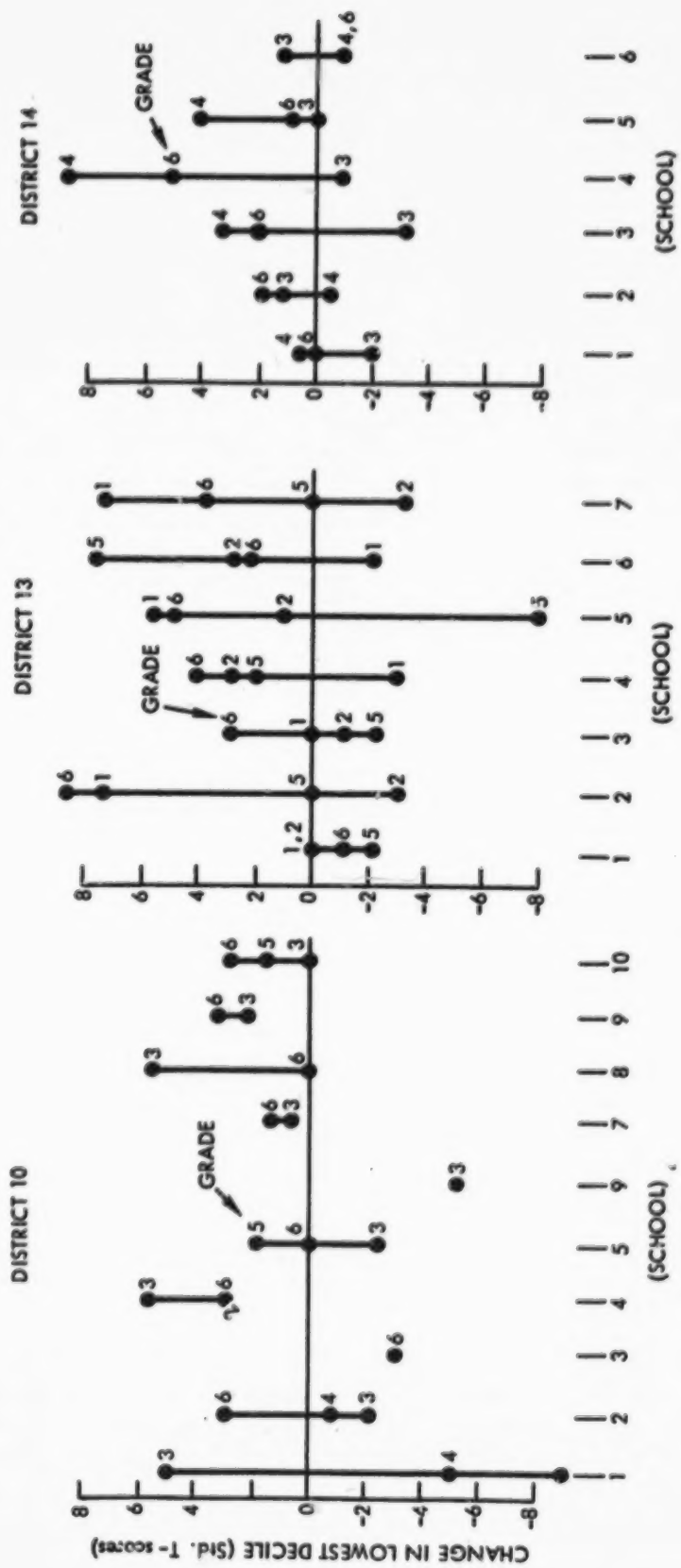

Figure 5. Observed changes in reading improvement, 1965 to 1966.

The results of analysis of the effects of high mobility are inconclusive. The estimated regression coefficients for Districts 10, 13, and 14 are generally negative, but they are small and not statistically significant. This does not, however, constitute strong evidence of no effect from mobility. First, the mobility was measured as an average for an entire school rather than the average for the pupils in each grade. Second, it is possible that pupils who do change schools do not get included in test results in a larger than normal percentage of cases. For example, they might be absent on the test day, or have moved away before the test, or their test score dropped for some special reason. Because of the frequent reference to the problem of mobility by local school officials and the slight evidence of the negative effect of high mobility from this study, the hypothesis that mobility has a significantly negative effect should be retained. The testing of this hypothesis, however, will have to be based on more extensive data than those used in this study.

The mean preachievement level was the one state variable that most frequently showed up as closely associated with change in achievement. Data for Districts 10, 12, 13,and 14 suggest that the lower the preachievement level, the greater the expected change in achievement. However, there are two important qualifications that must be cited. First, the longitudinal data for District 8 did not show the same inverse relation as in the fixed-grade approach for the other four districts. Second, errors in measurement are known to bias the estimates of the correlation and regression coefficients associated with a "preachievement level" variable.* After considering the possibility of bias, our best appraisal is that the true correlation between change in achievement and preachievement levels in Districts 10, 12, and 13 is indeed negative.

One possible explanation of the observed difference in the correlation calculated from "longitudinal" and "fixed-grade" data is that the latter might represent situations where the best CE was directed toward grades and schools which had the lowest achievement level. As in the case of mobility, this must remain a hypothesis to be tested.

Neither attendance rate nor change in attendance rate appeared to be significantly related to change in achievement.

Evidence from Districts 10 and 13 indicates that increases in percentage of Negro pupils are associated with an overall decrease in achievement level. This is likely to reflect a lower than average

*Measurement error bias is discussed in Appendix 6.

achievement level of Negro pupils at the time they move into a school rather than a smaller gain in achievement during the specified period when they were in a sample school. This result is in agreement with earlier studies, such as the Coleman study on equal educational opportunity (Reference 9).

There were few data in this study for analyzing whether grade level is associated with observed changes in achievement. The information that was available in the fixed-grade data and the longitudinal data gave no evidence that amount or direction of change in achievement was related to grade level.

There was a great deal of variation in observed changes in achievement among grades within sample schools, as is readily apparent in Figure 5 and in Figures 2, 5, 8, and 9 of Volume II. Except for schools in which there was only one observation, none of the 46 schools analyzed appeared to have a significantly better or worse than average change in achievement. The figures also reinforce the observation that the mobility, poverty, and attendance rate variables, which in this study were measured at the school level, might have differed significantly if measured at the grade level.

ALLOCATION OF CE FUNDS

Sample school districts allocated Title I funds over a wide range of CE activities. Table 2 shows the 28 different CE activities in District 8 arranged by order of magnitude on dollar expenditures per pupil. The allocation shown in Table 2 is typical of the allocation in other sample districts.

The allocation of Title I funds shows a fairly large expenditure per pupil for a small fraction of the pupils in Title I schools and a small expenditure per pupil for the majority of pupils. In District 8, for example, the four most intense activities accounted for 32 percent of Title I funds, but affected less than 4 percent of the pupils. In contrast to the intense activities it is noted that over 40 percent of Title I funds were spent on activities that involved less than $10 per pupil. Because of the small per-pupil expenditure on the majority of pupils, it seems reasonable to expect that significant enhancement could be detected only among those few pupils who participated in intense CE activities.

There are many ways in which allocation of CE funds can be meaningfully analyzed. Unfortunately, little data were available on what

Table 2. District 8 as an example of the distribution of Title I funds.

Activity	Total Cost of Activity ($000)[c]	% of Total CE[c]	No. of Pupils	% of Pupils in Title I Schools	$ Per Pupil
1	21.6	2.0	20	a	1,080.00
2	55.6	5.0	84	0.3	661.00
3	132.6	12.0	420	1.0	315.00
4	140.8	13.0	793	2.0	177.00
5	10.8	1.0	114	0.3	95.00
6	0.7	0.1	10	a	69.00
7	2.3	0.2	35	0.1	66.00
8	83.9	8.0	1,357	4.0	62.00
9	34.1	3.0	1,372	4.0	25.00
10	67.0	6.0	2,824	8.0	24.00
11	11.4	1.0	1,000	30.0	11.00
12	38.0	3.0	3,952	12.0	10.00
13	125.9	11.0	19,000	58.0	7.00
14	94.7	9.0	14,766	45.0	6.00
15	54.1	5.0	14,766	45.0	3.66
16	31.7	3.0	15,492	47.0	2.04
17	3.8	3.0	3,032	9.0	1.25
18	17.9	2.0	15,492	47.0	1.20
19	27.3	2.0	17,590	53.0	1.20
20	17.1	2.0	15,492	47.0	1.10
21	31.8	3.0	33,000	100.0	0.96
22	14.6	1.0	15,492	47.0	0.94
23	27.0	2.0	33,000	100.0	0.81
24	9.4	1.0	17,590	53.0	0.53
25	14.5	1.0	33,000	100.0	0.43
26	6.7	0.6	17,590	53.0	0.38
27	1.7	0.2	4,560	14.0	0.36
28	4.3	0.4	33,000	100.0	0.12
Total	1,100.0	100.0	NA[b]	NA[b]	NA[b]

Notes:

[a]Less than 0.1 %.

[b]NA indicates that the total of the column is not meaningful.

[c]Totals rounded.

priority system was set up in the budgeting process and what scheme was actually used in allocations of funds.

Although there are little data to test any hypothesis concerning allocation, TEMPO's work suggests that the following decision variables enter explicitly or implicitly at the district, school, and grade level:

1. Intense expenditure for a few pupils versus very small expenditures for most or all pupils in Title I schools;

2. CE for pupils who are at the lowest achievement levels versus pupils who are only slightly below average;

3. CE for pupils who have some special handicap versus pupils who are probably below average only because of lesser amount or quality of education in earlier years;

4. CE oriented directly toward the pupil versus activities oriented toward improving teachers;

5. CE directly oriented toward academic skills versus CE directed toward nonacademic aspects, such as attitude, health, culture, and recreation;

6. Within academic skills, a division between CE oriented toward reading versus orientation toward skills such as mathematics, science, and music;

7. Activities in testing, counseling, and guidance versus activities directly oriented toward overcoming educational disadvantages;

8. CE activities that are very similar to regular education versus CE that is more imaginative, innovative, and oriented toward specific problems of target pupils;

9. Decision on emphasis among grades kindergarden through 12;

10. Use of resources for additional personnel versus use for supplies, equipment, and construction;

11. CE activities during the regular academic year versus activities during the summer months;

12. Many different CE activities versus one or a small number of CE activities;

13. CE to meet objectives of and problems in school integration versus those not associated with integration.

We present brief summary comments on each of the above 13 categories but hasten to point out that they are based only on the five school districts reported in this phase of the study.

1. There appears to be a general tendency to allocate a small percentage (25 percent or less of Title I funds) for a very small number of intense CE activities ($300 or more per pupil) and to allocate the remainder to a large number of low-intensity activities affecting a large number of pupils.

2. It was not possible to differentiate between the frequency of activities devoted to helping pupils who are the lowest achievers and the frequency of activities devoted to helping pupils who have a good potential and are usually only slightly below average in achievement.

3. Since schools are selected for Title I funding on the basis of family income, there is some emphasis on CE for children who are likely to have been limited by below-average educational resources. Beyond this fact there is no information from this study about relative emphasis on special handicap versus educational deprivation due to lesser resources.

4. Virtually all CE is oriented directly toward improving pupil performance rather than improving quality of teachers. However, it is debatable whether increasing staff should be considered pupil-oriented or teacher-oriented.

5. Except for the first year, when considerable emphasis was placed on supplies, equipment, and construction, the major part of funds (usually 75 percent or more) has gone toward academic skills.

6. Reading-oriented activities usually accounted for 80 percent or more of the funds devoted to improving academic skills (see Reference 50).

7. It was not possible to develop good estimates of allocation for testing and counseling guidance because it was frequently included as part of an overall CE activity.

8. CE activities are predominately like regular education programs.

9. TEMPO has no additional information on emphasis by grade level because of the way costs were analyzed in relation to the pretest and posttest dates.

10. The breakdown by personnel versus supplies, equipment, and construction is available in the annual statistical reports and has been analyzed elsewhere (References 7, 30, 69, 70).

11. TEMPO obtained no significant additional information on allocation to CE activities during the summer versus activities during the regular academic year.

12. There appears to have been a general view among local education agencies (LEA) that there should be many different CE activities. The large number of categories specified on application forms and annual statistical reports probably encourages this view.

13. An objective of reducing the problem and obstacles associated with integration was explicitly mentioned in some instances. TEMPO data are too few to warrant any precise estimates of the relative emphasis on integration. Data in Appendices 1 through 5 provide more detail on the above points.

There is a set of decisions implied in the format of the "Annual Statistical Report of Title I Activities" and in the application forms for Title I funding. At some point each of these forms is filled in, but it is not clear whether they are meaningful categories or represent a manageable number of decisions in budgeting and allocation. For example, the application form that the Office of Education suggests each local education agency use in making application to the state (References 56 and 57) has the following types and number of breakdowns:

Objectives—five major and 23 subcategories,
Number of pupils by grade level—13 (K through 12),
Expenditures—20 types of expenditure accounts, and
Number of staff—18 assignment categories.

The Annual Statistical Report that OE receives from each LEA has the following types and number of breakdowns:

Number of staff—21 categories by type and assignment,
Total salaries—eight subcategories within teachers for handicapped,
Number of pupils by grade levels—13 (K through 12),
Instructional activities—18 categories (reading, music, etc.),
Number of pupils and total cost by type within instructional activities—18 categories (reading, music, etc.), and
Breakdown of total expenditures—three (equipment, construction, other).

With respect to the above breakdowns for allocation, it is possible to report only that data and discussions with local school officials do not indicate that these breakdowns were carefully analyzed in the allocation process.

TEMPO feels that each of the following questions must receive more complete attention:

- Assignment of priorities among alternative objectives in CE activities
- Estimates of expected results from the various types and amounts of CE for specified conditions (pupil, school, environment)
- Estimates of the most efficient manner and true cost per pupil of implementing specified CE activities.

There is virtually no information as to the weight that estimates in each of the above factors played in decisions on allocation of CE funds within any of the five districts analyzed in this study. There appears to be a pressing need for the U.S. Office of Education (or possibly state educational agencies) to provide more guidance to LEAs for developing better estimates and evaluations within each of the three factors (see References 22, 27, 43, 55).

VARIATION IN EXPOSURE TO CE

For a given allocation of CE funds within a school district there is still considerable variation in exposure to CE prior to the so-called posttest results. First, test dates varied from October to

May during the academic year. This means that some pupils in the sample had seven more months of exposure to CE, even though posttests were given in the same year. In Districts 12 and 14, TEMPO obtained test data for the fall of 1967, so the full year of CE in 1966-67 could be brought into the analysis. Second, in the case of fall tests, the estimate of expenditures was based on the grade in the previous year. This means that high mobility rates can bias the estimate of exposure to CE because pupils who took the test were not pupils who were exposed to the CE in that school.

For the posttest results used in this analysis, pupil exposure to CE varied from 5 months (February 1966 to October 1966) to 14 months (February 1966 to October 1967). For pupils who also participated in summer CE activities, the maximum exposure could have been 17 months.

The best estimate of the range and average level of per-pupil expenditure for CE in the 12-month period preceding the pretests and posttests is shown in Table 3. The variations in these figures

Table 3. Summary of expenditure and state variables.

	District 10		District 12		District 13		District 14	
	pre	post	pre	post	pre	post	pre	post
Expenditure Variables								
$ per pupil for CE activities								
Minimum	0	0	110	143	4	44	3	13
Maximum	0	88	126	368	127	355	102	150
Average	0	15	112	210	35	137	33	81
$ per pupil for regular teachers								
Minimum	124	141	246	214	140	191	238	217
Maximum	296	311	331	383	306	414	360	382
Average	178	195	287	293	242	266	297	318
State Variables (Average for 4 Districts)								
Mobility Rate, Percent	36	-	19	-	64	-	69	-
Negro Pupils, Percent	93	94	72	72	45	46	56	56
Spanish Pupils, Percent	1	1	0	0	27	29	0	0
Grade ADM (number of pupils)	77	77	77	89	86	88	82	82
Attendance Rate, Percent	89	92	94	95	72	72	95	93
Mean (Standard T-Scores) Achievement Level	40.2	39.7	44.4	44.0	40.7	42.1	43.5	43.1

reflect differences in allocation of funds as well as variations in test data. The effect of mobility could not be included in the figures used in the analysis and shown in Table 3. As can be seen, the average CE expenditures varied from $0 to $210 per pupil, and among individual grades the variation was from $0 to $368.

There is no indication in the data for these five school districts that CE funds replaced funds for the regular school program in Title I schools. If this had been the case, one would expect to find a negative correlation between CE and regular expenditures. In some cases, such as in the "Classes of Twenty" activity in District 8, the entire funds came from CE. But in this as well as other cases the total funds were generally greater than they would have been under the regular program.

The mean value for each of several state-of-condition variables is as shown in Table 3. Available data do not show that the amount of exposure to CE was closely related to any of the state variables considered in the analysis, with the possible exception of the mean pre-achievement level.

COMPARISON OF FIXED-GRADE AND LONGITUDINAL ANALYSES

The three main types of differences in the fixed-grade and longitudinal analytical approaches are:

1. Differences caused by sampling variation in measuring changes in achievement,

2. Differences between the types of pupils actually enrolled and the other pupils in the same grade,

3. Differences in measures of intensity of CE programs because only part of the pupils in a grade were actually exposed to the major CE activities.

The use of longitudinal data in analysis of District 8 CE provides some information on the value of obtaining and using longitudinal data but is not definitive as to whether the added cost of obtaining and analyzing longitudinal data is warranted.

In the first type of difference, the fixed-grade approach involves two different groups of pupils but the same test, while the longitudinal

approach involves the same pupils but two different tests because of different grade levels before and after exposure to CE. The only new information that analysis of District 8 CE provides on relati.e error of measuring changes in achievement shows that the correlation between pre- and post-scores for 95 grade 6 pupils from nine schools was 0.76 as compared to correlations of 0.68 and 0.74 between the pre- and post-mean-scores for Districts 10 and 13. If these correlations are a measure of reliability of measurement, there is no significant difference. At best, however, these correlations are a very crude measure of reliability and TEMPO feels that these results present little information on the first type of differences between the two approaches.

There is another calculation that is relevant to the first type of differences. In the Reading Improvement activity only about 20 percent of the pupils in a grade were involved. This means that the average change of 1.09 grade equivalent units for pupils who actually participated would yield an average change of only 0.21 based on the total of both participating and nonparticipating pupils. Unless the percentage of pupils involved in CE is known so that an adjustment can be made, the calculated average change of 0.21 would present a distorted view of the effect of CE. Further, in testing the statistical significance of observed changes, the sampling variation among the 80 percent nonparticipating pupils would reduce the discriminating power of the test.

There is more information with respect to the second type of difference. As shown in Table 55 of Volume II, knowledge of the characteristics of the specific pupils involved made it possible to estimate that they progress at a rate of about 0.65 grade-equivalent units per year compared to 0.96 for the other pupils in the same grade. In this instance it was possible to improve the accuracy of the "standard" for measurement by a factor of 0.5 (= [0.96-0.65] /-65). This is very significant. If the difference between pupils exposed to CE and other pupils in the same grade were known, the observed averages in the fixed-grade approach could be adjusted; but the calculations would be quite complex and, therefore, sensitive to error in measurement.

Tables 44 and 45 of Volume II provide data for evaluating the third type of difference in the two approaches. These data show how the intensity of various CE programs would be distorted if expressed in terms of the average of all pupils in the grade. For example, the average per-pupil expenditure for the 20 pupils participating in

District 8 Activity VIII D was $1,080. This would appear negligible if averaged over the approximately 10,000 pupils in grades 1 through 6 in the schools from which these pupils came. The average per-pupil expenditure in the Classes of Twenty (Activity IX) was $316, and this would have been negligible if averaged over the approximately 600 pupils in a school rather than the actual enrollment of 20 pupils.

Eight of the activities listed in Table 45 of Volume II had a per-pupil expenditure greater than the approximate $50 total CE per pupil. It does not seem reasonable to expect that specific activities such as those listed in the table could be effectively evaluated using the fixed-grade approach.

SECTION 4

SYNOPSIS OF TEMPO PHASE I STUDY

OBJECTIVES

During the Phase I study, data were analyzed from a sample of schools in 11 school districts which have received federal funds for the operation of compensatory education programs for disadvantaged children. The objectives were to develop preliminary answers to several important questions concerning the effects of compensatory education programs:

1. Has statistically significant enhancement of pupil performance resulted from compensatory education programs?

2. What school, pupil, and environment characteristics are associated with enhanced pupil performance?

3. What are the distinguishing features of successful compensatory education programs?

SUMMARY OF RESULTS

The sample included 132 schools which received funds from Title I for compensatory education to aid educationally disadvantaged pupils. Most of the 11 school districts from which the schools were drawn were selected because there was reason to believe that successful compensatory education programs were in progress in at least some of the district schools. Conclusions were based on a comparison of achievement scores in 1966-67, after pupils were exposed to compensatory education from Title I funds, with pre-exposure achievement scores in 1965-66.

There appeared to be a slight decline in average pupil achievement level in the sample schools. For the entire sample the average grade-equivalent score in 1966-67 was approximately one-half month lower than the corresponding grade equivalent score in 1965-66.

On the other hand, there appeared to be a slight improvement in achievement of pupils who were at the lowest achievement levels in their respective grades. The average grade equivalent score of pupils at the lowest decile in the 1966-67 tests was approximately one-fourth month higher than the average grade equivalent score of corresponding pupils on the 1965-66 tests. Although the one-fourth month change was very small, it was statistically different from the observed negative changes in both the mean score and the score at the upper quartile.

There was considerable variation in changes in achievement among school districts. One district showed a statistically significant increase in the average score while two showed significant declines. With respect to achievement at the lowest decile, none of the school districts showed significant decreases, but two districts did show significant increases.

The preliminary results of the study suggested that amount of improvement is related to level of Title I expenditures. The districts which showed the greatest improvement at the lowest decile were the districts which had the higher average Title I expenditures per pupil.

The two variables most closely related to changes in achievement were initial achievement level and percentage of Negro enrollment. Lower initial achievement levels in 1965-66 were associated with larger gains between 1965-66 and 1966-67. This suggested that the availability of Title I funds was probably helping pupils at the lowest achievement levels the most. Schools which had 40 to 60 percent Negro pupils showed the poorest response to compensatory education programs. Schools with 0 to 20 percent Negro pupils showed the best response.

It is always possible that the positive changes which were attributed to CE were due to sampling variation. Failure to draw conclusions on statistical results also involves risk. There can be a loss to society in failing to support a program that is actually successful but whose success cannot be clearly substantiated by available data. Our conclusions and the detailed discussions in the remainder of the Phase I report are an objective evaluation within the constraints of available data. However, it must be kept in mind that Title I funded programs were still relatively new at the time of 1966-67 tests, and it is not reasonable to expect conclusive evidence of enhancement in achievement so soon.

SECTION 4

The overall Phase I study provided considerable evidence that more specific studies were needed to evaluate properly the effects from Title I, and that more emphasis should be placed on getting participating schools to keep systematic records on pupil, school, and program characteristics. The records from many schools were not adequate for the types of analysis required to evaluate properly compensatory education.

Because the Phase I study results were not definitive, a Phase II study that would concentrate in more depth on 5 of the 11 districts was recommended. The Phase II study was to emphasize investigation of trends in achievement and to derive and analyze better estimates of CE activities employed at each grade unit included in the sample schools.

METHODOLOGY AND SAMPLE SELECTION

The study focused primarily, though not exclusively, on the impact of programs funded under Title I of the Elementary and Secondary Education Act during the first 18 months of its operation. The effects of compensatory education programs on pupil performance were assessed by comparing results on achievement tests and attendance rates prior to and after exposure to compensatory programs.

Data for this study were obtained from 11 school districts chosen for analysis because there was reason to believe that successful compensatory programs were in operation in at least some of the schools.* Within each district visited, a sample of schools was selected to reflect differences in the following characteristics: racial composition, degree of economic or educational deprivation, size of enrollment, history of prior compensatory programs, and intensity of current programs.

While schools were designated for inclusion in the study, for several reasons the grade rather than the school as a whole was the unit chosen for analysis in the study. The measures of student performance used are available for specific grades but not for all grades within a school. More important, compensatory programs are not necessarily spread evenly throughout the grades within a school or school system. Aggregating data on the resources and participation in compensatory programs for a whole school or aggregating student

*Although 14 school districts were originally included in the study, only 11 had data readily available for use in the study.

performance for a whole school is likely to mask the effects of compensatory education. Therefore, data on pupil performance, descriptions of compensatory programs, and expenditures for both regular and compensatory programs were gathered by grade for the 132 schools included in the sample.

The primary measure of achievement used in the study was the score on the reading subportion of various standardized achievement tests. Although reading may not be an appropriate measure of success for all the objectives of compensatory programs, it is a fundamental academic skill and is a central feature of a majority of compensatory projects throughout the country.

The analysis of achievement test results employed a "fixed-grade" approach in measuring the effects of compensatory programs. The distribution of achievement scores for children in a particular grade and school for the year preceding exposure to compensatory education was compared with the distribution of achievement scores for a different group of children in the same grade and school in the following year, when compensatory education programs had been implemented. It was assumed that, in the absence of special compensatory programs, the pattern of achievement scores in a grade would remain constant from one year to the next. Thus, changes in the distribution of test scores between the two years would reflect the impact of participation by the students in compensatory programs. The usefulness and validity of the fixed-grade approach were governed by the ability to identify and cope with the additional factors introduced by comparing results for two different sets of pupils. That is, any changes in the achievement pattern from one year to the next must be evaluated in light of normal changes in the level of educational services provided by the school district and changes in the socioeconomic composition of the student population. Either or both of these factors can influence the academic performance from one year to the next of the pupils in a grade.

The most important uncertainty in relying on observed differences in test scores in successive years to assess the effects of compensatory programs arises out of the possibility of trends in achievement scores which are independent of compensatory education. There was reason to expect a downward trend in the achievement level of pupils at inner-city schools (which constitute most of the sample) relative to the entire nation. This decrease in achievement scores for a given grade level over time has been associated with changes in the socioeconomic composition of the student population.

SECTION 4

An alternative approach involves the analysis of changes in the achievement test scores of the same students or groups of students throughout a given time. Longitudinal analyses are attractive because some variables are held constant. In this study, the choice of the fixed-grade approach was dictated by the difficulty in obtaining substantial amounts of longitudinal data. School systems do not as a rule test each grade each year. Further, high pupil mobility, the absence of centrally maintained cumulative records on individual pupils, and the difficulty at the time of the study of linking a pupil's test scores to his participation in particular compensatory programs ruled out the longitudinal approach.

Most of the analyses in this study were based on test data for academic years 1965-66 and 1966-67. The former (1965-66) was considered the "pre" year, or the year prior to compensatory education programs, and the latter (1966-67) as the "post" year, or the year in which there had been some exposure to compensatory programs. Although study teams collected information on compensatory programs regardless of the source of funding, the major infusion of funds resulted from Title I. Funds from Title I did not reach school systems until the spring of 1966, and in many cases the activities sponsored under Title I did not begin until the end of the school year. It was assumed, therefore, that the benefits of compensatory programs would not begin to be evident in achievement test scores until the 1966-67 school year.

Relatively few school systems keep records on the amount and type of compensatory programs in specific grades at a school, nor was it usually possible to identify the specific students within a grade who were participants in compensatory programs. Consequently, it was decided to use test results for all pupils in a grade and to gather information on all grades in the sample schools which had been tested with the same achievement test in both 1965-66 and 1966-67. Of the 150 schools originally selected for inclusion in the sample, 132 contained one or more grades—distributed as shown in Table 4—for which achievement test data were available for the two academic years in question. The sample includes the test results of 314 school grades for each of the two years. The total number of students in the sample is just under 35,000 for each year.

Data analysis was limited to standardized achievement tests administered to entire grades of pupils in a school district for each of two years, 1965-66 and 1966-67. In the 11 school districts in which achievement test data were available, four different tests were used—

Table 4. Distribution of the school grades used in the analyses of achievement test results.

School District	Number of Schools for Grade												Total Grades	Total Schools
	1	2	3	4	5	6	7	8	9	10	11	12		
1				10	17	4	4	4					39	21
2		10	12	12	12	10							56	12
3				15		15		5		1	1	1	38	21
4				11		11		5					27	16
5				14		14							28	14
6			2			2							4	2
8		9	9	9	9	9	3	4			3		55	16
10			9	2	2								13	9
12			4										4	4
13	7	7			7	7		2			2		32	11
14			6	6		6							18	6
TOTAL	7	26	42	79	47	78	7	20	0	1	6	1	314	132

the Stanford Achievement Test (SAT), the Metropolitan Achievement Test (MAT), the Iowa Tests of Educational Development (ITED), and the Sequential Tests of Educational Progress (STEP). There was no consistent pattern among the sample districts either of grades tested or of type of test used.

Results of the achievement tests used in the 11 sample districts were received in a variety of forms—class listings of individual pupils, punched cards of individual scores, computer tab runs by individuals, and computer printouts of frequency distributions. Test results were provided in terms of raw scores, standard scores, grade equivalents, percentile scores, and stanines. In order to work with such a variety of tests and test results, all scores were converted to national percentiles and then to a common form—the Standard T-score. The distribution of Standard T-scores in the population is constructed to be normal, with a mean of 50 and a standard deviation of 10. T-scores can be averaged and subjected to other simple statistical analyses, whereas other types of scores (such as percentiles) cannot. In some of the analyses, results for different grades were combined under the assumption that differences in T-scores are also comparable among grades. That is, the amount of movement involved in raising an achievement level by five points in one grade is approximately the same as a similar amount of movement in other grades.

SECTION 4

ANALYTICAL RESULTS

Results of the statistical analyses performed on the achievement test data are discussed in terms of average changes or the frequency of positive and negative changes. The data have been grouped in several different ways for showing relevance to each of the questions being addressed.

Enhancement of Achievement from CE

The term "enhancement" is defined as the difference between achievement level after exposure to some compensatory education programs and the achievement level which would have been expected in the absence of such programs. While it is possible to measure the achievement level of pupils who receive compensatory education, the achievement level of the same pupils in the absence of compensatory programs must be estimated. The results of most of the statistical tests presented below were based on observed differences in achievement scores between 1965-66 and 1966-67 rather than the estimated difference between achievement with and without exposure to compensatory programs. The operative assumption was that the distribution of achievement scores should not change from one year to the next. That is, no adjustment was made for possible trends in the level of achievement within a grade. Thus, if there were in fact a downward trend in the level of achievement, the observed differences between the two years is an overly pessimistic estimate of the differences between achievement with and without compensatory programs.

OVERALL SAMPLE. There was no indication of general improvement in the average achievement level of the entire student population in the 314 school grades analyzed. There was, however, an indication of a slight improvement in the achievement level of students at the lowest achievement levels in their respective grades, as shown by Table 5.

Although it was not possible to link the performance of students on achievement tests with their participation in compensatory programs, there is reason to believe that compensatory programs, especially remedial ones, were usually oriented toward the most seriously disadvantaged students or those with the lowest achievement scores. This means that we might hope for more favorable results for students at the lower achievement levels (e. g., the lowest decile) than for students at higher achievement levels. The

Table 5. Average change in reading achievement test scores for the total sample.

Achievement Test Statistic	Average Change[a]	Standard Error	Significance Level[b]
Lowest Decile (D_1)	+0.25	0.18	0.20
Lower Quartile (Q_1)	-0.30	0.16	0.10
Mean (X)	-0.29	0.13	0.05
Upper Quartile (Q_3)	-0.48	0.17	0.01

Notes:

[a]In units of Standard T-scores and based on observed changes in 314 school grades in 11 districts.

[b]The probability that the observed sample result could have happened by chance if the true change between 1965-66 and 1966-67 was indeed zero.

change in achievement scores at the lowest decile across all of the grade levels was positive, but represented only about one-fourth of a month in terms of grade equivalent units. If, however, this small positive value indicates a reversal of a negative trend, it is of considerable importance.

There was a slight decline in achievement at the mean and the first and third quartiles for all of the grade levels in the sample schools. These results suggest that even with compensatory education programs present, there is a slight negative trend in achievement level of inner-city schools.

The positive change in the lowest decile, while not very large, becomes more significant when contrasted with the negative changes in the mean and the first and third quartiles. In the absence of special compensatory programs, one would normally expect the four statistics to move in the same direction since they were derived from the same distribution of achievement scores. The probability of the observed improvement occurring at the lowest decile and the observed decline at the mean and the first and the third quartiles would be unlikely by chance alone. Hence, this could be an indication of a positive effect of compensatory programs if one assumes they are usually concentrated on the lowest achieving students in a grade.

INDIVIDUAL DISTRICTS AND VARIATION AMONG DISTRICTS. There was wide variation in the pattern of achievement changes which occurred within and among the sample school districts (as shown by Table 6).

SECTION 4

Table 6. Average change in mean reading test scores by district.

School District	No. of Grades Observed	Average Change in Mean[a]	Average Change in Lowest Decile[a]
1	39	+0.25	+0.05
2	56	-1.35[b]	+0.04
3	42	-0.34	+0.22
4	27	-1.03[b]	-0.68
5	28	-0.16	-0.70
6	4	+1.28	+4.20
8	55	-0.37	+0.26
10	13	-0.21	+0.55
12	4	+0.42	+1.78
13	32	+1.16[b]	+1.32[b]
14	18	+0.01	+0.04

Notes:

[a]In units of Standard T-scores.

[b]Statistically significant at the 5 percent confidence level.

Nine of the eleven districts show a positive change at the lowest decile, but only one district shows the change to be statistically significant at the 5 percent confidence level. The sampling variation for the mean is smaller, and here we find three of the eleven districts showing a statistically significant change.

There appears to be significant differences among the districts. The +4.20 change for District 6 probably reflects large sampling variation because there were only four observations. However, the range between the +1.16 change in the mean for District 13 and the -1.35 change in the mean for District 2 is large. This represents a difference of approximately 2.5 grade-equivalent months over a 12-month period.

Characteristics Associated with Enhanced Performance

Changes in pupil performance were analyzed in relation to a number of variables reflecting school, pupil, and environmental characteristics. The variables chosen for examination included grade level, degree of economic deprivation, student mobility, proportion of Negro pupils in the school in the 1965-66 school year, change in Negro

enrollment, proportion of Spanish-speaking students in the school during the 1965-66 school year, mean reading achievement level in the school during the 1965-66 school year, mean attendance rate at the school in 1965-66, change in rate of attendance from 1965-66 to 1966-67, size of school, and size of grade. Several different types of analyses were carried out in an attempt to identify the relationships between each of the variables and changes in achievement. The results of these analyses follow.

GRADE LEVEL AND CHANGE IN ACHIEVEMENT. There may be critical grade levels in the normal 12 years of public education during which it is relatively easy to compensate for the effects of educational deprivation and other grade levels when it is relatively difficult. If educationally deprived children are given special help at the appropriate grade level, they may be able to overcome most, if not all, of their disadvantages. It is generally held that the early grades are the most important levels of intervention.

In this study, however, the results of several different analyses provided no evidence that changes in achievement were related to grade level.

ECONOMIC DEPRIVATION. One of the criteria for selection of schools to participate in Title I of the ESEA is a high concentration of children from low-income families in the school attendance area. The standards used to determine eligibility for Title I and to define the number of low-income children in a school vary from school district to school district. In view of these differences in the definition of "low income," it was not possible to devise a single scale of economic deprivation for all 11 districts. Therefore, each school in the study was classified as being high, medium, or low in terms of economic deprivation relative to all Title I schools in that district.

None of the analyses performed indicated any reliable relationships between degree of economic deprivation and changes in achievement-test scores.

MOBILITY. High student mobility is a condition that is likely to dilute the effects of compensatory education for several reasons. The range of compensatory programs can and does vary from school to school, so that a student who transfers from one school to another may not be able to continue in the same type of compensatory program. Moreover, the disruption caused by transferring may have an undesirable effect on the student's general performance. High rates of

mobility make it difficult to assess the effectiveness of compensatory programs at a school since many of the students taking what we have called the "posttest" may have had very little exposure to the compensatory programs in the school in which they are tested.

The results of the analyses performed gave inconclusive evidence for the effects of mobility on changes in achievement. Two of the analyses yielded opposite results on the possible negative effect of high mobility. This might have been caused by mobility being correlated with other variables which also influence changes in achievement.

NEGRO ENROLLMENT. There appears to be a nonlinear relationship between changes in achievement between 1965-66 and 1966-67 and the proportion of Negro students in a school. Of the 132 schools in the sample, those with relatively low Negro enrollments (less than 20 percent) and those with relatively high Negro enrollments (more than 80 percent) tended to show statistically significant positive changes in achievement at the mean, the first quartile, and the first decile. The group of sample schools in the 40-59 percent Negro category showed statistically significant negative changes in achievement at the mean and at the first quartile. Since there was considerable variation in racial composition among the sample districts, it might be thought that these results simply reflect difference among districts. However, further statistical tests indicated that the relationship between changes in achievement and percentage of Negro enrollment is similar within each of the districts.

CHANGE IN NEGRO ENROLLMENT. There were 26 sample schools in which the Negro enrollment at the school changed 5 percent or more between 1965-66 and 1966-67. These 26 schools contained 53 school-grade observations, of which 41 increased in percentage Negro and 12 decreased. Changes in achievement-test scores at the mean and first decile for these school grades indicated that relatively large changes in percentage Negro in either direction are associated with less favorable changes in achievement.

SPANISH-SPEAKING ENROLLMENT. Several of the districts in the sample had sizable proportions of Spanish-speaking pupils. The analysis did not reveal any significant relationship between percentage Spanish and change in achievement. These results were not decisive since the statistical tests were based on a small subsample, and there was little variation in percentage of Spanish-speaking pupils among schools within each district.

MEAN READING LEVEL, 1965-66. It is reasonable to expect that compensatory education programs are being directed at the most educationally deprived students rather than those with relatively high achievement. Therefore, the nature of the program would suggest a negative correlation between change in achievement and original achievement level—that the most dramatic increases would come for students at the lowest end of the achievement distribution. The analyses performed in this study substantiate the hypothesis.*

MEAN ATTENDANCE RATE, 1965-66. For the sample as a whole, there was a small positive correlation between rate of attendance and change in achievement.

CHANGE IN ATTENDANCE RATE. Attendance is assumed to vary with pupils' motivation to learn. Increasing rates of attendance might therefore be positively associated with change in achievement. Correlations computed from the sample data showed no clear relationship between these two variables. The measures of change in attendance were crude, since the definition of attendance differed among the sample districts, and there were no controls for other factors (such as weather or illness) which might affect attendance rates.

SIZE OF GRADE AND SIZE OF SCHOOL. The statistical evidence showed no significant relationship between changes in achievement and the number of pupils in a grade or the size of the school.

Distinguishing Features of Successful CE.

The main focus of this study was on changes in achievement test scores between 1965-66 and 1966-67 and the relationship between those changes and selected pupil-school-environmental variables. It was possible, however, to make two preliminary examinations of the effects from different levels of expenditure for compensatory programs on achievement. The first was the inclusion in regression

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*Because of imperfections in our measuring instruments, it was thought that there might be a built-in correlation between original levels of a variable and changes in that variable from one time to another. However, further statistical tests showed that the observed negative correlation between initial level and gain in mean achievement scores cannot be attributed to an artifact of test unreliability but should be accepted as indicating a true negative relationship.

analyses of a variable indicating average Title I expenditure per pupil in each sample district. The second examination involved case studies of specific compensatory programs at particular grades in two districts as prototype studies of estimating cost and analyzing results of compensatory programs.

EXPENDITURE PER PUPIL. In order to relate expenditures to achievement test results, a new variable, "effective Title I dollars per pupil," was created. For each sample observation this variable was computed as the sum of average Title I dollars per pupil in 1965-66 plus a portion of the average Title I dollars per pupil in 1966-67. The portion used for 1966-67 was based on the fraction of the academic year which had elapsed up to the date of the 1966-67 test for each specific grade unit. This variable did not take into account any funds other than Title I which might have been expended by the school district for compensatory programs.

For the 11 districts, there was a positive correlation between effective Title I dollars per pupil and changes in achievement test scores. The correlation was statistically significant at the 5 percent level for each of the four measures of achievement—change in the mean, change in the first decile, and changes in the first and third quartiles.

At the level of specific school districts, there also seemed to be a congruence between changes in achievement-test scores and effective Title I dollars per pupil. The three districts with the highest level of Title I funding had the largest gains in achievement at the first decile.

These positive findings should be regarded as a very crude attempt to determine the overall relation between level of funding and achievement change. The findings were based on highly aggregated data which did not give a true picture of what is happening at the grade level. Analyses of achievement change indicated that not only was there great variation in performance among districts, but also great variation among schools within a district and even among grades within the same school.*

TWO CASE STUDIES OF SPECIFIC CE PROGRAMS

In order to develop reliable estimates of the contribution of compensatory education to enhanced pupil achievement, it is necessary

*The Phase II study considers the relationship between changes in achievement and the kinds and costs of compensatory programs at the grade level within sample schools in five districts.

to measure or estimate resource expenditures and to describe programs at the same level at which pupil performance measurements (e.g., achievement and attendance) are made. While pupil performance measures were available for grades within schools, compensatory program descriptions and financial data were primarily available for the school district as a whole. Program description and financial data at the district level—or even at the school level—of aggregation masked the variation in programs and expenditures which occurred within a school in any school district. It is, therefore, necessary to estimate the program participation and resources expended for particular grades within a school.

Wide disparities existed among the sample school districts in the amount, degree of detail, and level of aggregation of data on compensatory program descriptions and expenditures. It was obvious from data received from school districts that substantial additional effort would be required to extract, summarize, standardize, and process the information and to assign values to the variables which would be used in subsequent attempts to identify the characteristics of successful compensatory programs. Two of the school districts in the sample were selected to determine the feasibility of assigning compensatory program resources to the grade level. The case studies of these two districts were designed to yield a better understanding of the variation in types of compensatory programs, duration, and intensity of pupil participation in those programs and the specific amounts expended for each grade in the two districts. More important, the case studies were undertaken to provide guidance on the preferred method for assigning these resources to the grade level for all sample schools in the second phase of this study.

Information Required

The objective of each case study was to obtain detailed knowledge of compensatory programs, schools, and pupils. Both case studies sought to determine the resources normally devoted to each grade as a part of the regular school program in the district and the additional programs and resources added to the grade by the compensatory education programs of the district. Once identified, the incremental services and resources provided to the grade were related to available measurements of pupil performance.

Both case studies attempted to catalog all of the compensatory services made available to a grade and to estimate the resources expended to provide those services. Fragments of information on the regular school program and compensatory activities had to be assembled from many sources. The following list illustrates the kinds of

information considered necessary for later attempts to analyze the relationship between the compensatory services provided and pupil performance:

1. Program descriptions—objectives, activities, personnel assigned, materials and supplies used, pupils (by schools and grades), time and duration of program, and pupil participation and exposure;

2. School/pupil characteristics—ethnic composition, economic status, relative academic level, staff composition and turnover, and special classes;

3. Attendance records by school and grade—average daily attendance, average daily membership, gains, losses, percent attendance and absence, and unusual factors or events influencing attendance;

4. Financial records—district budget and expenditure reports, expenditures by school and project for regular and special programs, expenditures by time periods, and sources of funds;

5. Evaluation reports—objectives, activities, staff and pupil participation, project expenditures by time periods, staff and pupil performance, and measurement devices and their characteristics.

The Two Approaches

Different approaches to the allocation of resources to the grade level were employed in the two districts selected as case studies. The approaches were dictated by the availability of program and financial data from the school districts.

In one of the districts (District 10), financial data were available for individual schools, both for the normal school program and for compensatory programs. Information was collected on compensatory education activities authorized for the sample schools. Compensatory resources were then distributed to the grades within the schools based on these authorizations.

A different approach was used to describe compensatory programs for District 13 because of the absence of any financial data on a school-by-school basis. The approach used in District 13 began with the identification of the specific programs implemented at each grade within the

sample schools and used available financial data to estimate the resources required to carry out these activities.

The District 10 approach assumed that compensatory programs were implemented in reasonably good agreement with the original proposal or project description and that there was little variation in the implementation of programs among schools, except as indicated in the planning documents. In other words, it was assumed that a reading program at one school was operated in the same grades, for approximately the same number of participants, and for approximately the same expenditure of resources as the same reading program at another school. The approach used in District 13 attempted to catalog the distribution of program resources which actually occurred at the grade level in a school. It avoided the assumption that there was little or no variation in the operation of compensatory programs at different schools. Because it dealt with what actually occurred, the approach used in District 13 required more detailed information about pupil participation, staffing, costs, and changes of programs in a school.

The second approach was the more time consuming of the two but was more desirable in view of the observed deviation from original compensatory program proposals in many of the sample school districts. In some instances, variation in compensatory programs from school to school or grade to grade during the first semester of Title I (spring 1966) resulted from an inability to hire staff in the middle of a school year or to obtain equipment, supplies, and materials on short notice. The conduct of a given program during the following school year (1966-67) was more likely to be in accord with the budget and plan of the school district.

For District 10, where school-by-school expenditure data were available, the initial step in allocating compensatory program resources to the grade level involved assembling descriptive information on each compensatory project in the sample schools. Next, descriptive and quantitative summaries were prepared for compensatory projects indicating (1) the number of schools in the district and in the participating sample, (2) the number and grade level of pupil participants, (3) total and per-pupil expenditure, and (4) hours of pupil exposure. Finally, when the grade levels served by each project had been identified, reported expenditures were allocated to appropriate grades by project and time period for each sample school.

District 13 did not maintain financial data by school. It was possible, however, to obtain fairly detailed compensatory program

descriptions on a grade-by-grade basis. Once the compensatory activities pursued in a grade were identified, it was necessary to cumulate a catalog of resource inputs from various sources and to estimate their costs. For each compensatory project and for each grade in a sample school, the following information was gathered: (1) number of equivalent full-time teachers, (2) number of direct pupil beneficiaries, (3) average size of participating pupil group, (4) average hours per week per participant, (5) weeks of exposure per pupil, (6) instructional salaries, and (7) other expenditures.

Conclusions from the Case Studies

Although different approaches were utilized in the two cases studied, several findings emerged which were common to both. Wide variation was found in the extent and types of compensatory programs operating among schools in the same district and among grades within the same school. Similarly, considerable variation from year to year in per-pupil expenditure for both compensatory programs and regular school programs was found to exist among schools and among grades within a school. This suggests that both types of expenditures should be considered in the evaluation of the effects of compensatory education funds on the enhancement of achievement.

For each of the two districts studied, estimates of resources, based on expenditures for regular and compensatory education programs, were prepared for each grade in the sample schools. To illustrate the use of these resource estimates, selected comparisons were made between changes in expenditures and changes in achievement test scores. In District 10, no relationship appears to exist. In District 13, a positive relationship was observed between change in achievement scores and expenditures for a small sample of grades and schools.

No firm conclusions should be drawn about the relationships between the level of compensatory services and performance measures from these limited examinations. The variations both in services provided among grade units and in achievement measures among grade units suggest that it will be necessary to seek resource-performance relationships at the grade level. If analyses are carried out on a more aggregate level, such as for the school as a whole, possible sources of differences in the relationship between compensatory resources and enhanced achievement may be hidden.

SECTION 5

BASIC DATA ON FOUR DISTRICTS

This section contains a copy of printouts of the basic data for Districts 10, 12, 13, and 14 (Table 7). There is a total of 72 grade-unit observations in 27 schools. These data, which are interpreted in Figure 6, are available on cards and on tape. . . . .

Longitudinal data used in the analysis of District 8 are not shown. These are available from TEMPO working notes. Data on the other seven districts included in Phase I are presented in Appendix I of Reference 43.

City
School
Grade
% Negro Pre
% Negro Post
% Span Spkt Pre
% Span Spkt Post
Sam. Size Pre
Sam. Size Post
Gr. Att. Rate Pre
Gr. Att. Rate
Test Date Pre
Test Date Post
Exp. $ Pre
CE $ Pre
Exp. $ Post
CE $ Post
Mean Reading Pre
Δ Mean (Post-Pre)
Δ 1st Decile (Post-Pre)
Δ Q1 (Post-Pre)
Δ Q3 (Post-Pre)
04 03 04 24 38 02 01 024 025 89 +25 105 106 239 003 204 110 465 -003 +002 +032
Post-pre Test at 75%ile was -1.9 Standard T-scores
Post-pre test at 25%ile was +3.2 Standard T-scores
Post-pre test at 10%ile was +0.2 Standard T-scores
Post-pre test at the Mean was -0.3 Standard T-scores
Mean pre achievement test score was 46.5
Total per pupil CE Expenditures in 12 months preceding post test, $110
Regular per pupil teacher expenditures in 12 months preceding post test, $204
Total per pupil CE expenditures in 12 months preceding pre test, $3
Regular per-pupil teacher expenditures in 12 months preceding pre-test, $239
Tested October 1965 and October 1966
Attendance up 2.5% 1965-66 to 1966-67
Attendance in 1965-66 was 89%
No. of students tested in 1965-66 and 1966-67
2% of pupils were Spanish speaking in 1965-66 and 1% in 1966-67
24% of pupils were Negro in 1965-66 and 38% in 1966-67
Grade 4 of School 3 in District 4
Identifies School 3 of District 4
Identifies the school district

Figure 6. Data interpretation example.

Table 7.[a] Data from Districts 10, 12, 13, and 14.

City	School	Grade	% Negro Pre	% Negro Post	% Span Spk Pre	% Span Spk Post	Sam. Size Pre	Sam. Size Post	Gr. Att. Rate Pre	ΔGr. Att. Rate	Test Date Pre	Test Date Post	Reg. $ Pre	CE $ Pre	Reg. $ Post	CE $ Post	Mean Reading Pre	ΔMean (Post-Pre)	Δ1st Decile (Post-Pre)	ΔQ_1 (Post-Pre)	ΔQ_3 (Post-Pre)
10	1	3	69	99	0	0	25	21	92	31	95	96	239	0	204	0	440	1	48	15	-20
10	1	4	69	99	0	0	22	24	94	-26	95	13	296	0	228	0	445	-55	-49	-55	-63
10	1	6	69	99	0	0	7	15	93	21	36	37	155	0	311	21	491	-59	-99	-109	0
10	2	3	99	99	0	0	66	55	88	32	95	96	165	0	213	19	422	-9	-20	-20	-10
10	2	4	99	99	0	0	60	61	86	23	95	96	155	0	147	50	414	-26	-8	15	-33
10	2	6	99	99	0	0	57	54	91	11	36	37	178	0	189	88	374	13	28	21	13
10	3	6	99	99	0	0	159	126	91	37	36	37	156	0	196	8	427	-38	-30	-27	-45
10	4	3	99	99	0	0	36	38	89	19	95	96	171	0	157	11	394	48	57	38	25
10	4	6	99	99	0	0	23	14	91	34	36	37	199	0	303	0	384	-4	37	10	-24
10	5	3	99	99	0	0	169	234	82	99	95	96	145	0	185	0	405	-17	-20	-30	-30
10	5	5	99	99	0	0	165	212	88	60	95	96	135	0	179	0	364	16	15	5	26
10	5	6	99	99	0	0	128	181	91	39	36	37	180	0	149	6	364	-9	0	-4	-11
10	6	3	74	99	0	0	37	64	91	-22	95	96	208	0	185	27	412	-30	-52	-40	-10
10	7	3	90	44	10	10	56	54	92	15	95	96	187	0	237	30	446	10	6	30	-17
10	7	6	90	44	10	10	18	23	91	35	36	37	225	0	236	41	422	-3	10	25	-33
10	8	3	99	99	0	0	97	79	84	99	95	96	144	0	208	0	425	-14	60	-10	-52
10	8	6	99	99	0	0	75	87	87	71	36	37	175	0	171	6	379	11	0	13	5
10	9	3	99	99	0	0	62	74	87	38	95	96	139	0	162	6	391	30	20	50	10
10	9	6	99	99	0	0	80	61	95	-5	36	37	191	0	144	5	381	-2	28	0	-24
10	10	3	99	99	0	0	81	58	83	11	95	96	147	0	148	0	335	40	0	60	33
10	10	5	99	99	0	0	64	64	86	-4	95	96	124	0	141	0	390	-21	15	-25	-39
10	10	6	99	99	0	0	44	47	87	-16	36	37	199	0	193	0	338	17	22	45	29
12	1	3	36	37	0	0	26	45	95	10	96	97	331	120	383	368	445	42	62	54	19
12	2	3	99	99	0	0	85	64	95	-7	96	97	241	110	214	143	459	-18	-17	-5	-13
12	3	3	52	51	0	0	88	111	95	-7	96	97	252	110	257	161	455	-21	-20	-24	-25
12	4	3	99	99	0	0	108	137	92	24	96	97	326	110	319	167	417	-19	-40	-16	-21
13	1	1	8	11	14	16	123	124	97	-7	56	57	259	4	257	80	403	-4	0	0	0
13	1	2	8	11	14	16	106	104	97	-7	56	57	277	4	263	131	422	18	0	27	15
13	1	5	8	11	14	16	74	106	97	-7	105	106	335	36	208	47	482	-14	-21	0	-17
13	1	6	8	11	14	16	108	94	97	-7	16	106	237	17	218	58	411	17	-16	-4	35
13	2	1	24	25	21	23	100	82	96	11	56	57	273	6	334	133	381	41	76	23	34
13	2	2	24	25	21	23	74	84	96	11	56	57	200	6	279	186	406	-4	-28	5	-4
13	2	5	24	25	21	23	52	72	96	11	105	106	253	6	263	44	469	-26	0	-3	-42
13	2	6	24	25	21	23	63	50	96	11	16	106	215	8	261	47	380	50	89	64	41
13	3	1	56	56	11	13	62	99	96	0	56	57	253	13	282	117	412	44	0	23	91
13	3	2	56	56	11	13	64	78	96	0	56	57	270	7	250	178	438	7	-10	-11	2
13	3	5	56	56	11	13	48	55	96	0	105	106	209	7	279	48	473	-32	-19	-25	-22
13	3	6	56	56	11	13	50	42	96	0	16	106	225	7	225	56	363	53	32	41	58
13	4	1	80	85	12	9	120	110	96	2	56	57	237	61	250	130	403	-24	-28	-35	-31
13	4	2	80	85	12	9	96	98	96	2	56	57	234	96	251	253	401	18	30	0	19
13	4	5	80	85	12	9	62	92	96	2	105	106	180	110	213	110	454	9	21	0	5
13	4	6	80	85	12	9	79	78	96	2	16	106	230	113	213	143	359	31	41	44	49
13	5	1	11	11	84	88	24	39	97	-10	56	57	306	11	332	259	374	19	56	58	0

10	10	3	99	99	0	0	81	58	83	11	95	96	147	0	148	0	335	40	0	60	33
10	10	5	99	99	0	0	64	64	86	-4	95	96	124	0	141	0	390	-21	15	-25	-39
10	10	6	99	99	0	0	44	47	87	-16	36	37	199	0	193	0	338	17	22	45	29
12	1	3	36	37	0	0	26	45	95	10	96	97	331	120	383	368	445	42	62	54	19
12	2	3	99	99	0	0	85	64	95	-7	96	97	241	110	214	143	459	-18	-17	-5	-13
12	3	3	52	51	0	0	88	111	95	-7	96	97	252	110	257	161	455	-21	-20	-24	-25
12	4	3	99	99	0	0	108	137	92	24	96	97	326	110	319	167	417	-19	-40	-16	-21
13	1	1	8	11	14	16	123	124	97	-7	56	57	259	4	257	80	403	-4	0	0	0
13	1	2	8	11	14	16	106	104	97	-7	56	57	277	4	263	131	422	18	0	27	15
13	1	5	8	11	14	16	74	106	97	-7	105	106	335	36	208	47	482	-14	-21	0	-17
13	1	6	8	11	14	16	108	94	97	-7	16	106	237	17	218	58	411	17	-16	-4	35
13	2	1	24	25	21	23	100	82	96	11	56	57	273	6	334	133	381	41	76	23	34
13	2	2	24	25	21	23	74	84	96	11	56	57	200	6	279	186	406	-4	-28	5	-4
13	2	5	24	25	21	23	52	72	96	11	105	106	253	6	263	44	469	-26	0	-3	-42
13	2	6	24	25	21	23	63	50	96	11	16	106	215	8	261	47	380	50	89	64	41
13	3	1	56	56	11	13	62	99	96	0	56	57	253	13	282	117	412	44	0	23	91
13	3	2	56	56	11	13	64	78	96	0	56	57	270	7	250	178	438	7	-10	-11	2
13	3	5	56	56	11	13	48	55	96	0	105	106	209	7	279	48	473	-32	-19	-25	-22
13	3	6	56	56	11	13	50	42	96	0	16	106	225	7	225	56	363	53	32	41	58
13	4	1	80	85	12	9	120	110	96	2	56	57	237	61	250	130	403	-24	-28	-35	-31
13	4	2	80	85	12	9	96	98	96	2	56	57	234	96	251	253	401	18	30	0	19
13	4	5	80	85	12	9	62	92	96	2	105	106	180	110	213	110	454	9	21	0	5
13	4	6	80	85	12	9	79	78	96	2	16	106	230	113	213	143	359	31	41	44	49
13	5	1	11	11	84	88	24	39	97	-10	56	57	306	11	332	259	374	19	56	58	0
13	5	2	11	11	84	88	39	33	97	-10	56	57	283	9	320	355	366	47	12	40	56
13	5	5	11	11	84	88	33	44	97	-10	105	106	140	19	179	82	438	-14	-78	0	-9
13	5	6	11	11	84	88	34	41	97	-10	16	106	195	31	225	81	379	8	44	24	-4
13	6	1	44	44	40	43	96	112	96	-4	56	57	268	18	298	167	369	15	-21	0	46
13	6	2	44	44	40	43	86	101	96	-4	56	57	261	16	334	216	385	18	28	0	33
13	6	5	44	44	40	43	79	82	96	-4	105	106	159	63	281	123	438	-1	78	-14	0
13	6	6	44	44	40	43	82	91	96	-4	16	106	187	39	191	111	376	6	24	-4	13
13	7	1	91	92	7	8	108	94	96	-14	56	57	251	34	330	97	396	47	76	0	71
13	7	2	91	92	7	8	90	82	96	-14	56	57	257	57	414	261	386	6	-28	0	30
13	7	5	91	92	7	8	59	70	96	-14	105	106	235	65	205	114	461	-3	0	0	-18
13	7	6	91	92	7	8	62	62	96	-14	16	106	242	127	266	210	361	53	41	34	65
14	1	3	78	81	0	0	75	69	95	-13	106	107	293	48	281	80	444	-5	-30	-20	20
14	1	4	78	81	0	0	83	60	95	-13	106	107	273	4	368	91	417	6	8	30	-10
14	1	6	78	81	0	0	69	64	95	-13	106	107	291	56	233	79	436	-11	-25	-5	10
14	2	3	3	4	-0	0	103	96	95	-17	106	107	264	7	382	13	466	16	57	10	10
14	2	4	3	4	-0	0	89	99	95	-17	106	107	238	8	297	24	449	-2	10	10	5
14	2	6	3	4	-0	0	86	80	95	-17	106	107	297	36	219	140	476	-9	-30	-20	-18
14	3	3	44	42	0	0	78	69	96	-34	106	107	299	38	352	86	439	-8	-18	-5	-20
14	3	4	44	42	0	0	85	78	96	-34	106	107	286	61	340	83	439	-21	-30	-35	-30
14	3	6	44	42	0	0	64	62	96	-34	106	107	271	27	317	126	410	15	0	8	25
14	4	3	32	27	0	0	85	114	93	-9	106	107	278	3	316	93	454	-11	-52	-10	0
14	4	4	32	27	0	0	80	92	93	-9	106	107	354	4	432	68	446	-44	-80	-50	-70
14	4	6	32	27	0	0	76	76	93	-9	106	107	262	39	273	131	424	8	7	0	20
14	5	3	96	96	0	0	35	29	95	-5	106	107	293	99	217	150	427	-12	-50	-5	0
14	5	4	96	96	0	0	31	28	95	-5	106	107	322	3	368	17	396	17	4	15	10
14	5	6	96	96	0	0	21	27	95	-5	106	107	360	5	311	20	408	-22	-20	-20	-25
14	6	3	83	84	0	0	66	81	95	-16	106	107	286	44	322	99	474	10	20	30	-10
14	6	4	83	84	0	0	78	74	95	-16	106	107	300	102	309	95	411	14	-5	20	23
14	6	6	83	84	0	0	88	73	95	-16	106	107	307	17	319	75	413	-13	-50	0	-0

Note:

[a] See Figure 6 for interpretation of data.

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ABSTRACT

800 This report presents the results from analysis of Compensatory
801 Education (CE) in 11 school districts across the country. Data were
802 obtained on amount and type of CE and on achievement scores of pupils
803 participating in CE during the first two years (1965-66 and 1966-67) of
804 Title I of the Elementary and Secondary Education Act of 1965.
805
806 The objectives of the study were to provide tentative answers to the
807 following questions: 1) Has CE resulted in significant improvement in
808 reading achievement level? 2) Which types of CE are successful?
809 3) What pupil-school-environmental factors are correlated with change
810 in achievement? Results indicate enhancement of achievement as a
811 result of CE among the pupils at the lower achievement levels in their
812 grades. Concentrated CE activities for reading appear to be most suc-
813 cessful. Initial achievement level and racial composition are two vari-
814 ables which were found to be correlated with changes in achievement.
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